

Atlantic Lower Cretaceous Clastic (ALK C1) Play

Polycostella senaria through *Favusella washitaensis* biozones

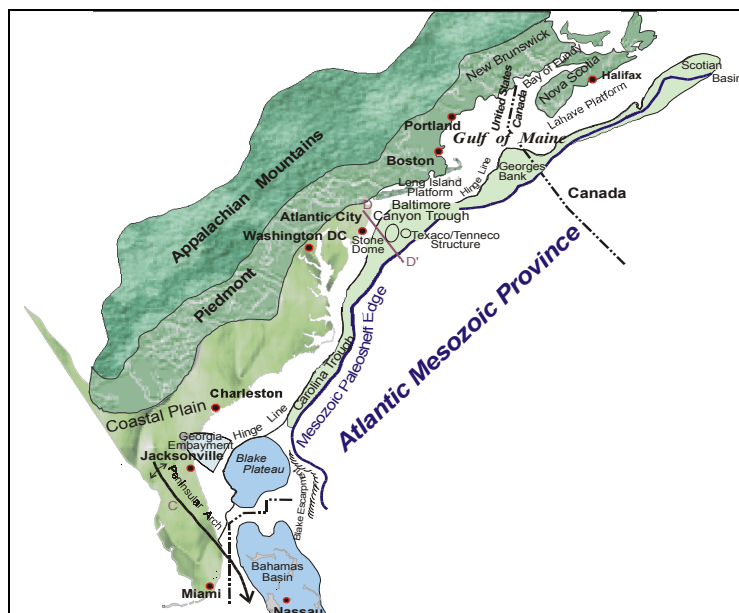


Figure 1. Physiographic map of the Atlantic Margin.

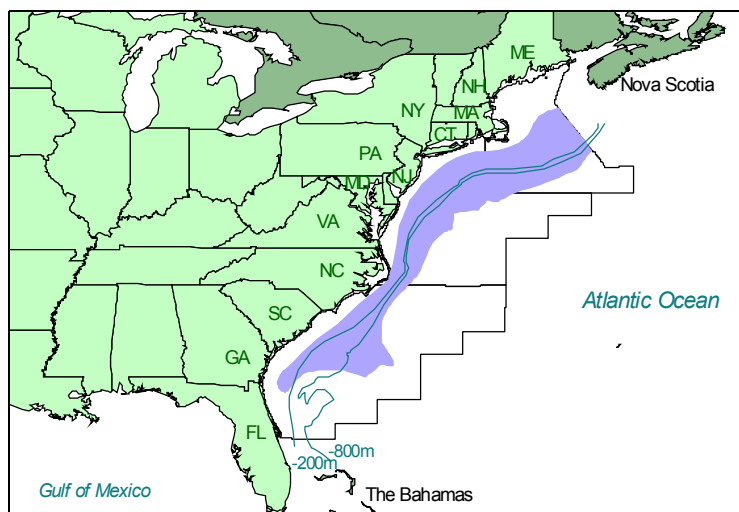


Figure 2. Play location.

Play Description

The frontier Atlantic Lower Cretaceous Clastic (ALK C1) play occurs within the *Polycostella senaria*, *Choffatella decipiens*, *Mud-erongia simplex*, and *Favusella washitaensis* biozones. This play extends from the U.S.-Canadian border through the Carolina Trough to the Blake Plateau (figures 1 and 2).

The updip limit for this play coincides with the updip limit of potential source rocks. The downdip limit is defined by lower Cretaceous clastic sediments that prograded over the upper Jurassic carbonate shelf and onto the slope.

The ALK C1 play is stratigraphically and structurally similar to the Atlantic Upper Jurassic Clastic (AUJ C1) and the Atlantic Middle Jurassic Clastic (AMJ C1) plays. However, the ALK C1 play does cover a larger geographic area than either the AUJ C1 or AMJ C1 plays.

Play Characteristics

During the lower Cretaceous, clastic sediments were eroded from the Appalachian Mountains and were deposited on the Atlantic Margin shelf. Delta complexes prograded across the shelf and, when clastic influx was great enough, fans were deposited on the slope. Potential lower Cretaceous reservoirs were deposited in deltaic complexes, barrier bars, and channel systems on the shelf, and in fan complexes on the slope. Petrophysical analyses of cores indicate that some of the best reservoir-quality sands in the Atlantic Mesozoic Province occur in this play.

Potential trapping structures on the shelf include anticlines, normal faults, and growth faults. Potential trapping features on the slope include anticlines and sediment pinch-outs against diapirs. Potential source rocks include Jurassic shales and possibly Jurassic platform carbon-

2000 Assessment Mesozoic Stratigraphy						
	Gulf of Mexico Basin	South Florida Basin	Gulf of Mexico Plays*	Atlantic Basin/ Scotian Basin	Atlantic Plays	
Cretaceous	Upper	Selma Gp Taylor Gp Eutaw Fm Eagle Ford Gp Tuscaloosa Gp	Pine Key Fm	UK2 C1 Wyandot Fm Dawson Canyon Fm Mid SS Mbr Sable Island Mbr	AUK C1	
	Lower	Dantzler Fm Washita Gp Fredericksburg Gp Paluxy Fm Glen Rose Fm Mooringport Fm Ferry Lake Fm Rodessa Fm James Fm Pine Island Fm Sligo (Pettet) Fm Hosston Fm Cotton Valley Gp	Dollar Bay Fm Sunniland Fm Brown Dolomite Zone Pumpkin Bay Fm Bone Island Fm	LK8 B1 LK6 B1 LK3 B1 LK3 B2 LK8-LK3 B1 LK8-LK3 B2 LK8-LK3 C3 LK3 B2 UJ4 A1 UJ4 B1 UJ4 X1 UJ4 B2 UJ4 X2 UJ4 C1 UJ4 BC1	Logan Canyon Fm Upper Mississauga Fm — 0 Marker — M. Simplex shale Lower Mississauga Fm Mic Mac Fm	ALK C1
Jurassic	Upper	Cotton Valley Gp Haynesville Fm Buckner Fm Smackover Fm Norphlet Fm	Wood River Fm Basal Clastics	UJ4 A1 UJ4 B1 UJ4 X1 UJ4 B2 UJ4 X2 UJ4 C1 UJ4 BC1	Mohawk Fm Motran Mbr Abenaki Fm Mohican Fm	ALU C1 AMU C1 AMU B1
	Middle	Louann Salt	Non-Deposition		Argo Salt	
	Lower	Basement			Eurdice Fm Basement	
Triassic	Upper	Eagle Mills Fm Basement				

Rock unit positions do not imply age relationships between basins.
* Does not include plays that span ages.

Figure 3. Mesozoic stratigraphy of the Gulf of Mexico and Atlantic Margins.

ALK C1 Play Marginal Probability = 1.00	Number of Pools	Oil (Bbbl)	Gas (Tcf)	BOE (Bbbl)
Reserves				
Original proved	0	0.000	0.000	0.000
Cumulative production	—	0.000	0.000	0.000
Remaining proved	—	0.000	0.000	0.000
Unproved	0	0.000	0.000	0.000
Appreciation (P & U)	—	0.000	0.000	0.000
Undiscovered Conventionally Recoverable Resources				
95th percentile	—	0.431	7.840	1.985
Mean	120	0.722	11.767	2.816
5th percentile	—	1.143	18.813	4.190
Total Endowment				
95th percentile	—	0.431	7.840	1.985
Mean	120	0.722	11.767	2.816
5th percentile	—	1.143	18.813	4.190

Table 1. Assessment results for reserves, undiscovered conventionally recoverable resources, and total endowment.

ates. Geochemical analysis indicates organic matter to be primarily Type III with total organic carbon (TOC) ranging from 0.5 to 3 percent. The hydrocarbon evolution window extends from approximately 7,000 to 18,000 feet. Potential seals are provided by early to late Cretaceous limestones and overlying shales.

Discoveries

Exploration in the Atlantic Federal OCS area consists of 46 exploration and 5 COST wells. Of these wells, all but one penetrated the lower Cretaceous interval. The only hydrocarbons detected in the ALK CL play occurred in Tenneco's Hudson Canyon 642-2 well drilled in 1979. The well flowed at 640 bopd.

Analog

Because the ALK C1 play contains no active Federal fields, productive lower Cretaceous clastic sediments of both the onshore Gulf of Mexico and the lower Cretaceous and upper Jurassic clastic sediments of the Canadian offshore Scotian Basin (figure 1) provide the analogs for input parameters used in this assessment.

The onshore Gulf of Mexico lower Cretaceous clastic analog comprises the Hosston, Rodessa, Paluxy, and Dantzler Formations of Louisiana, Mississippi, and Alabama (figure 3). This analog encompasses an area of 13.7 million acres (21,395 square miles). The analog type field for the ALK C1 play is the Citronelle Field, Mobile County, Alabama. Production from the lower Cretaceous clastic section in this field is from the Rodessa Formation.

Exploration in the Gulf of Mexico analog area has a success rate of approximately 10 percent, and drilling is at a mature stage with about 75 percent of the analog area explored. These analog fields contain an average of 39 percent oil, 35 percent gas, and 26 percent mixed hydrocarbons. Fields producing from the well-established Norphlet trend

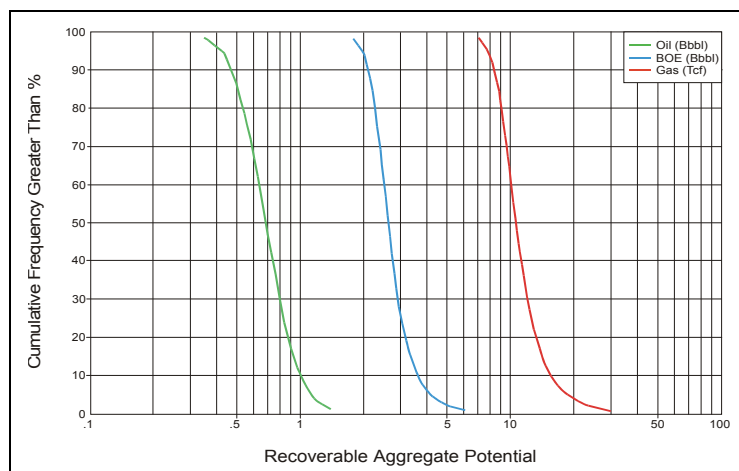


Figure 4. Cumulative probability distribution for undiscovered conventionally recoverable resources.

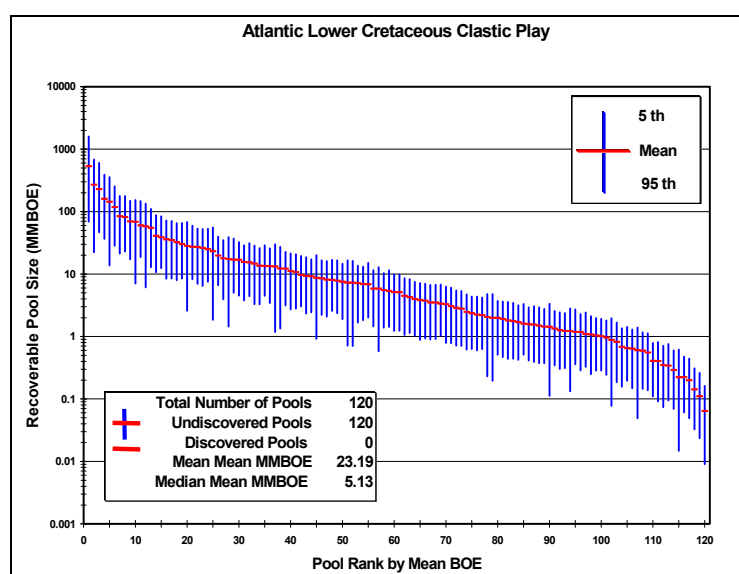


Figure 5. Pool rank plot showing the number of discovered pools (red lines) and the number of pools forecast as remaining to be discovered (blue bars).

were not used as analogs in this assessment because they produce from eolian sands that are not analogous to the deltaic deposits in the ALK C1 play.

The Scotian Basin clastic analog comprises the Lower Cretaceous Missisauga and Logan Canyon Formations and the Upper Cretaceous Dawson Canyon and Wyandot Formations (figure 3). This analog area covers 35 million acres (54,700 square miles). Exploration has a success rate of approximately 30 percent, and drilling is at an immature stage with only about 30 percent of the analog area being explored. This analog was used primarily for field size distribution parameters because production data were not available.

Assessment Results

The marginal probability of hydrocarbons for the ALK C1 play is 1.00. Assessment results indicate that undiscovered conventionally recoverable resources (UCRR) have a range of 0.431 to 1.143 Bbo and 7.840 to 18.813 Tcfg at the 95th and 5th percentiles, respectively (table 1 and figure 4). Mean UCRR are forecast at 0.722 Bbo and 11.767 Tcfg (2.816 BBOE). These undiscovered resources might occur in as many as 120 pools. These pools have a mean size range of <1 to 535 MMBOE (figure 5) and a mean mean size of 23 MMBOE.

The ALK C1 play is projected to contain the largest amount of undiscovered gas resources (43%) and the second largest amount of undiscovered oil resources (32%) of all 11 Atlantic plays. Potential for discoveries extends from the U.S.-Canadian border through the Carolina Trough to the Blake Plateau (figure 2).